

Proteus/NAST Participation in CLAMS

CLAMS Planning Workshop, NASA LaRC (21-22 February, 2001)



Performance:

Ceiling 55-65 kft

Airspeed 300-350 ktas

Endurance 12-22 hrs

Operating Altitude:

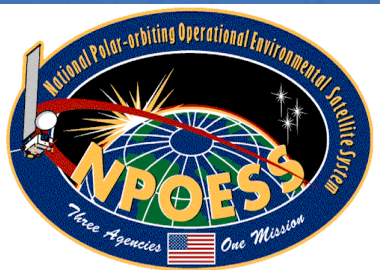
100 to 65000 ft (Can Profile)

Maximum Payload: > 4500 lbs

Runway Required: 3000 ft

Total In-field Crew:

Pilot, Co-pilot, Engineer



**HALO™
NETWORK**

Raytheon

NAST-M
(54, 118 GHz)

NAST-I

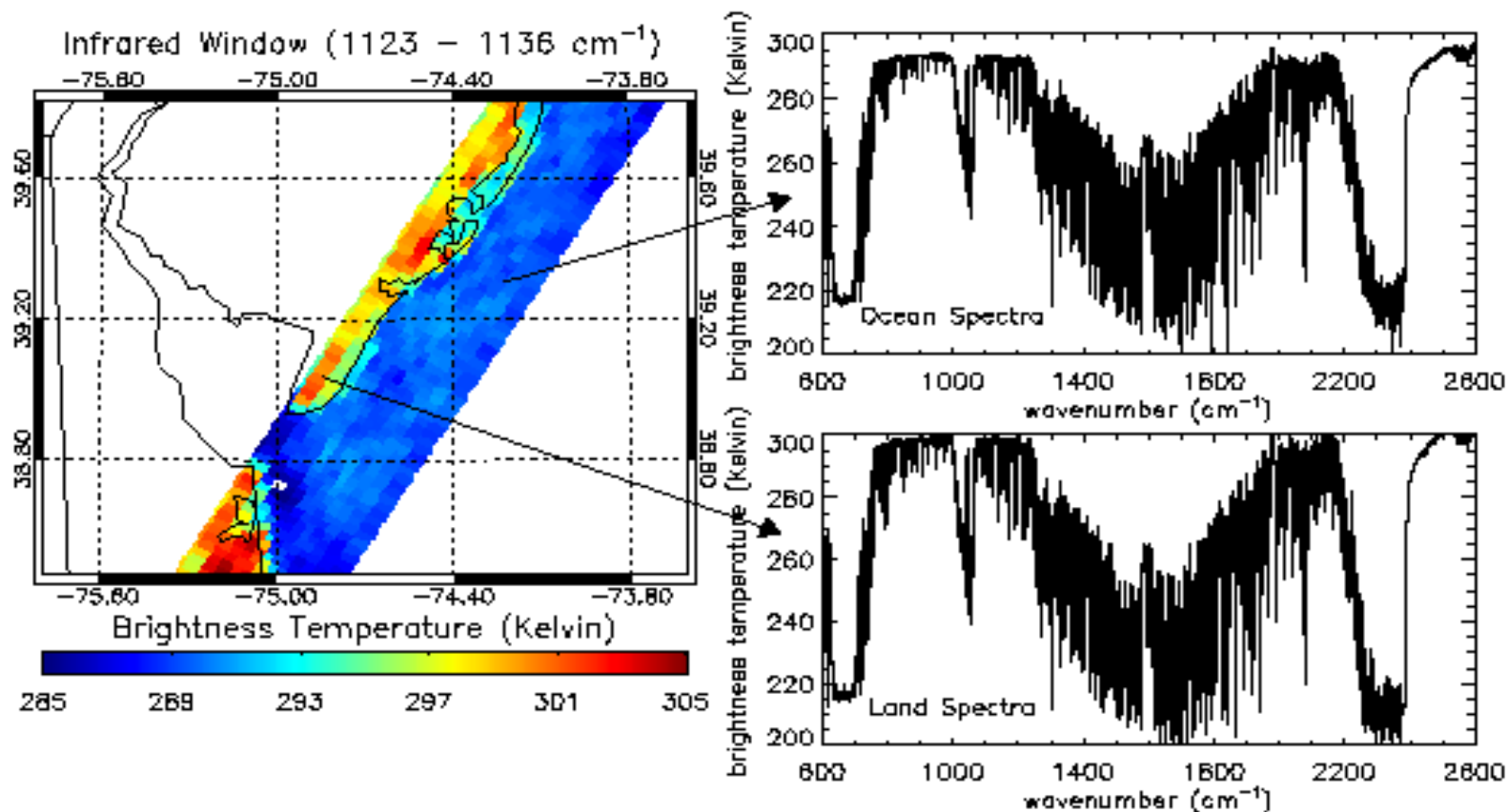
3.5 – 16 micron @ 0.25 cm⁻¹

Proteus Configuration

NAST-I Observes 3-Dimensional Structure

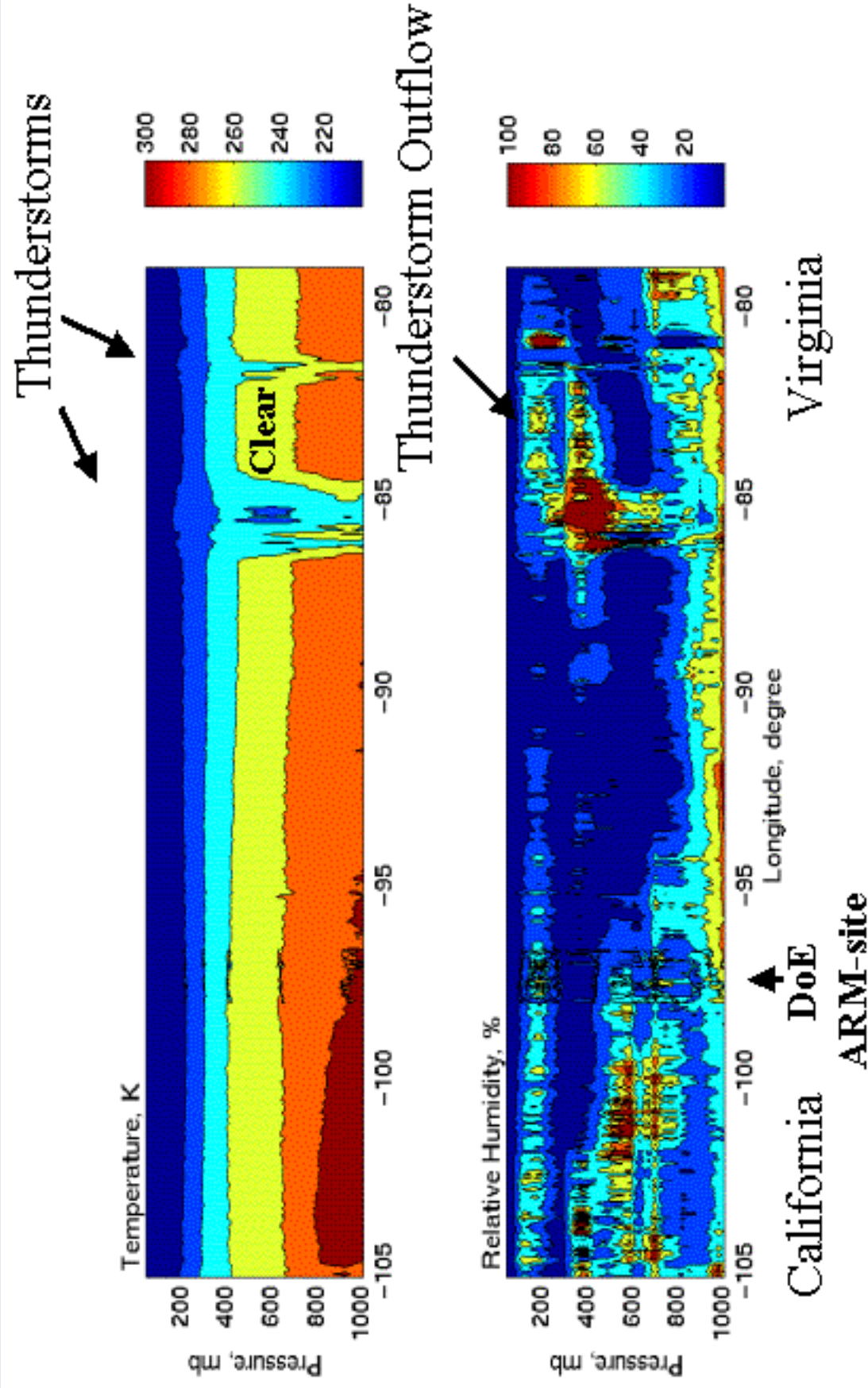
With High Spatial Resolution and Radiometric Accuracy

Wallops-98 (July 11, 1998)
NAST-I Observations

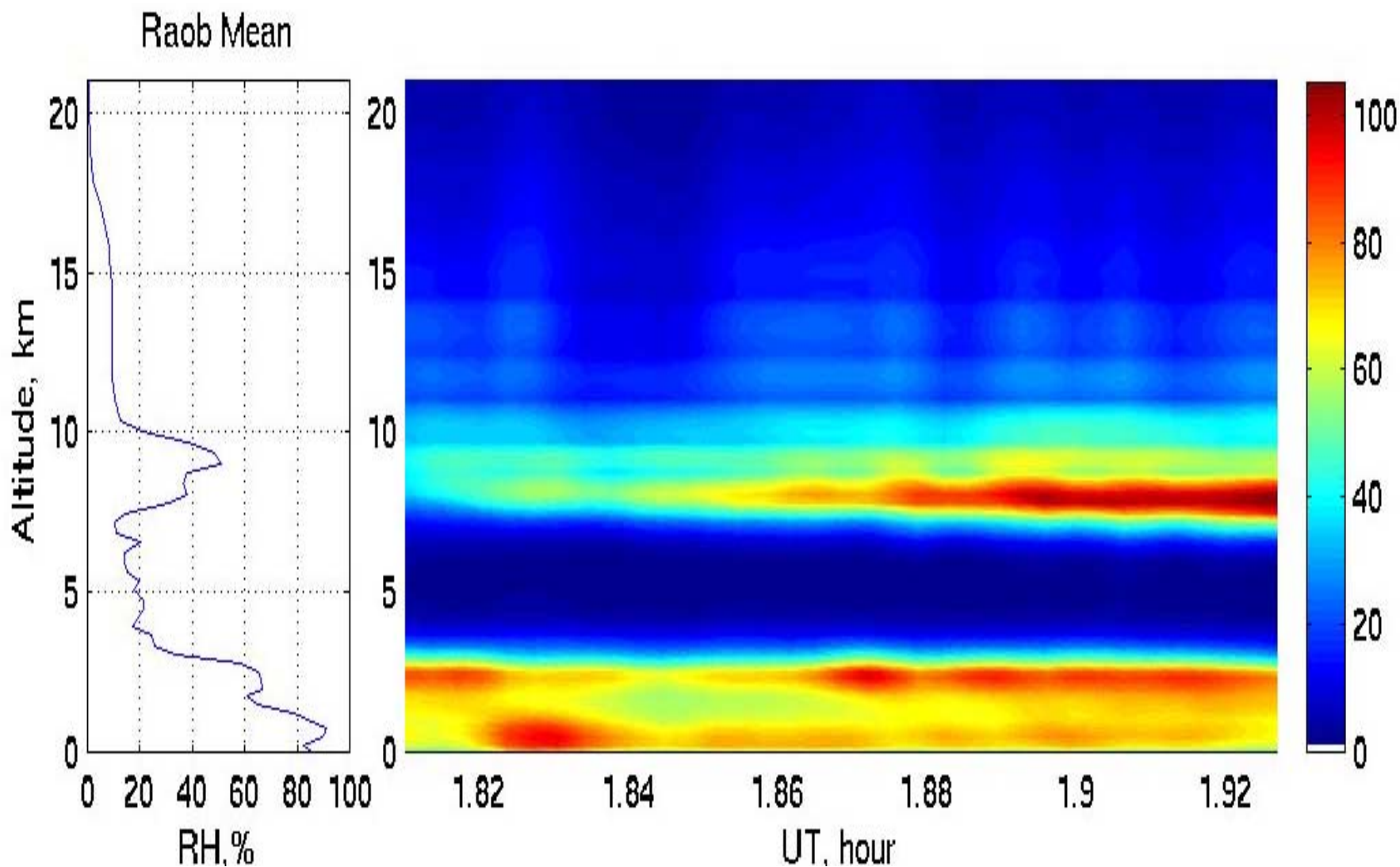
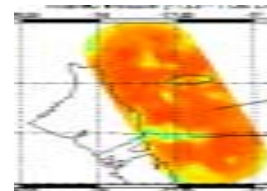


Cross-section: Wallops Is. Va to Dryden, Ca.

(Aug. 27 1999)



CAMEX Validation (Sept. 14, 1998)

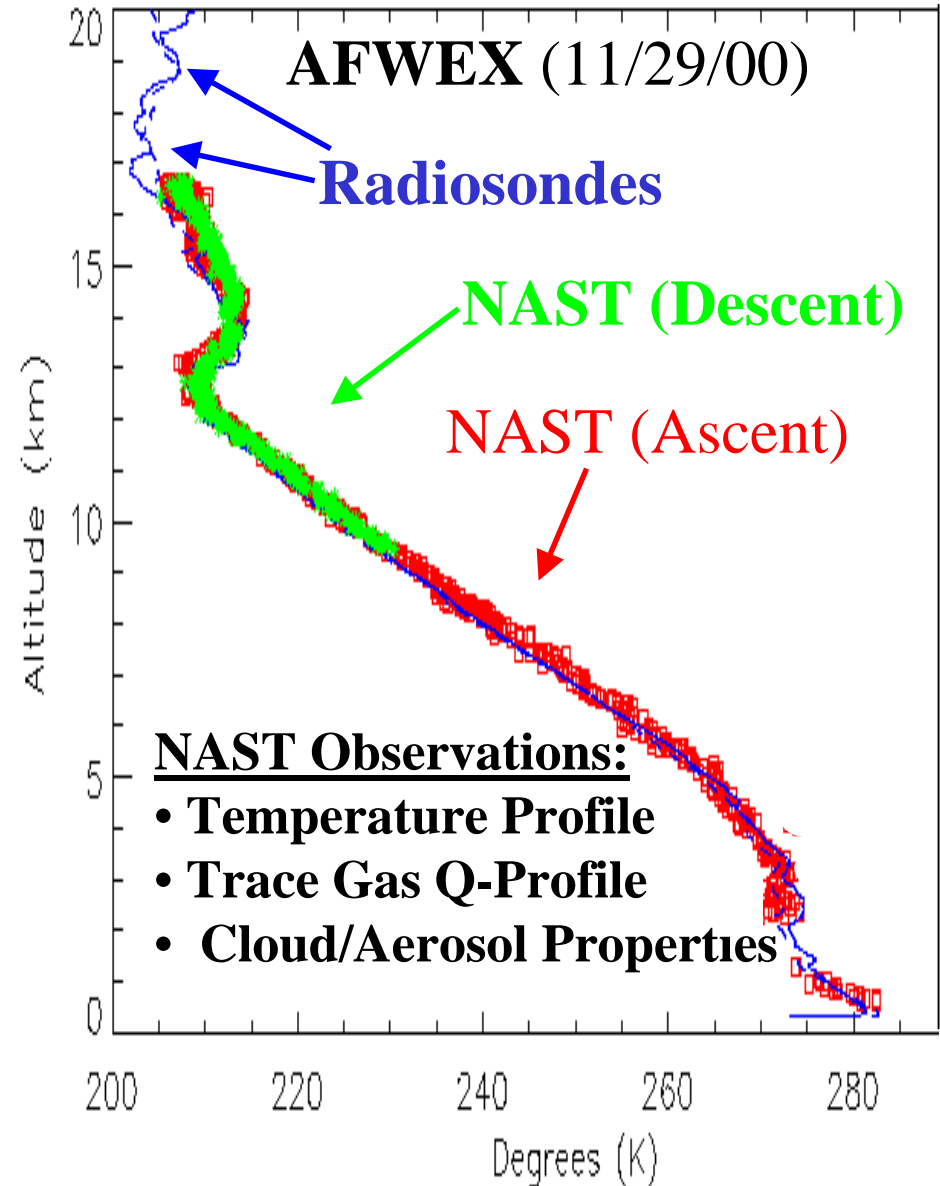
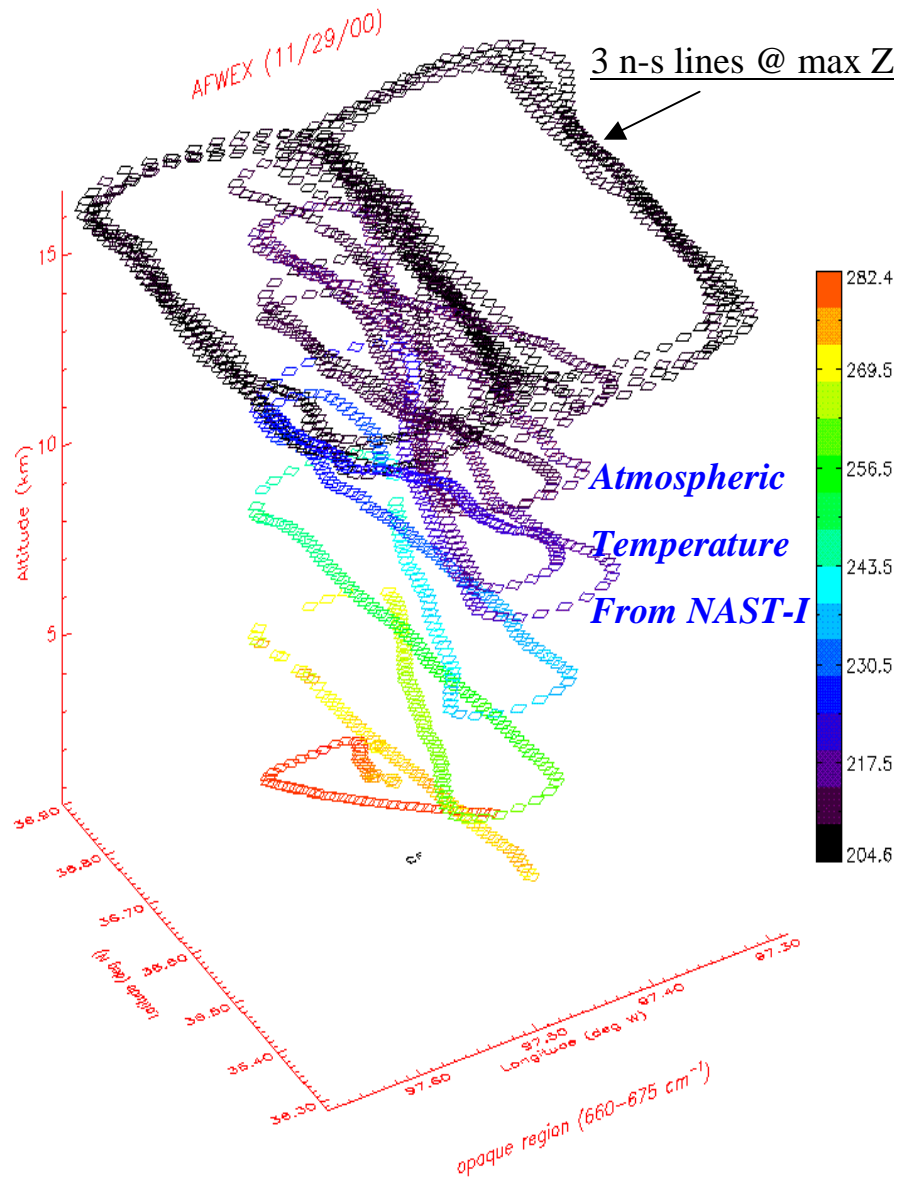


NAST/Proteus Flight Patterns:CLAMS

- **Mapping Flights (Model Input):** A single grid of north-south, or east-west legs, depending upon prevailing winds, spaced to get near contiguous coverage at 500 mb (~6 km). The length of the legs will be ~ 175 km and the width of the grid ~ 260 km, with 20 km spacing (14 legs); total flight duration is 6-8 *hours, depending on distance from airport.*
- **Trace Gas and Water Vapor Transport Flights:** Five contiguous grids of flight tracks centered over Cheseapeake Bay area or CLAMS observation area; 4 north-south grid lines of 100 km length, each separated by 20 km; duration is ~ 7 *hours.*
- **Vertical Profiling Flights:** spiral ascents/descents between 1 kft – 56 kft over Cheseapeake Light sampling area with variable climb rates (~ 400-1000 fpm), and horizontal pattern ranges (~50 - 75 km); ~ 1 – 4 ½ hrs.

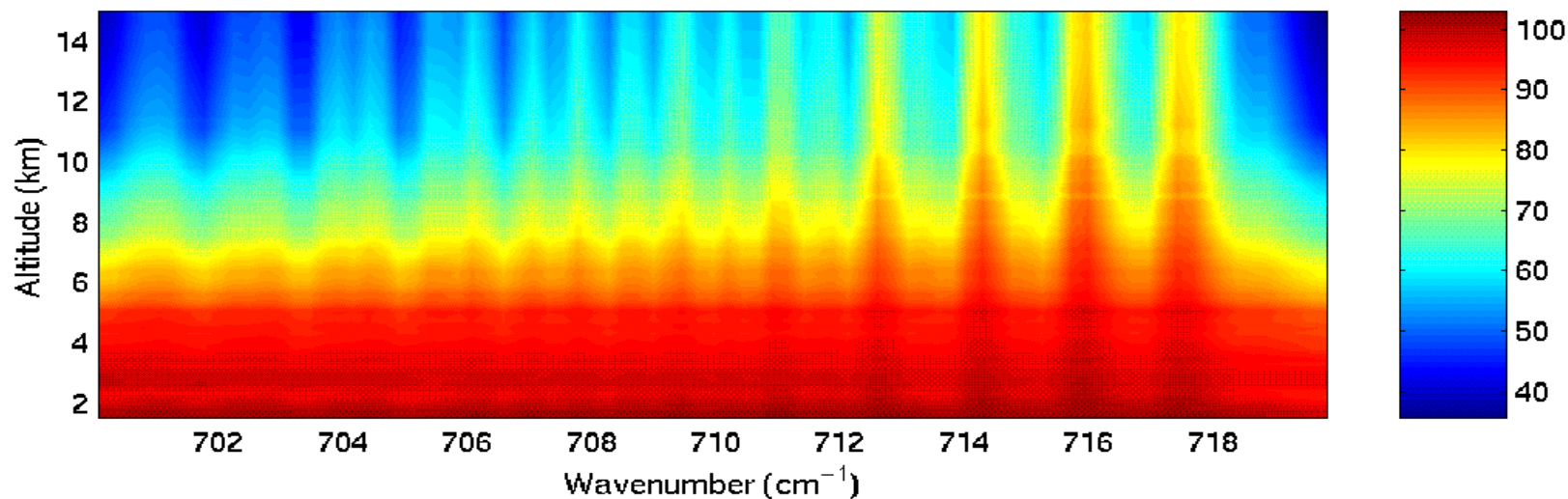
@ ~ 50 – 55 kft

Spiral Profile and Mapping

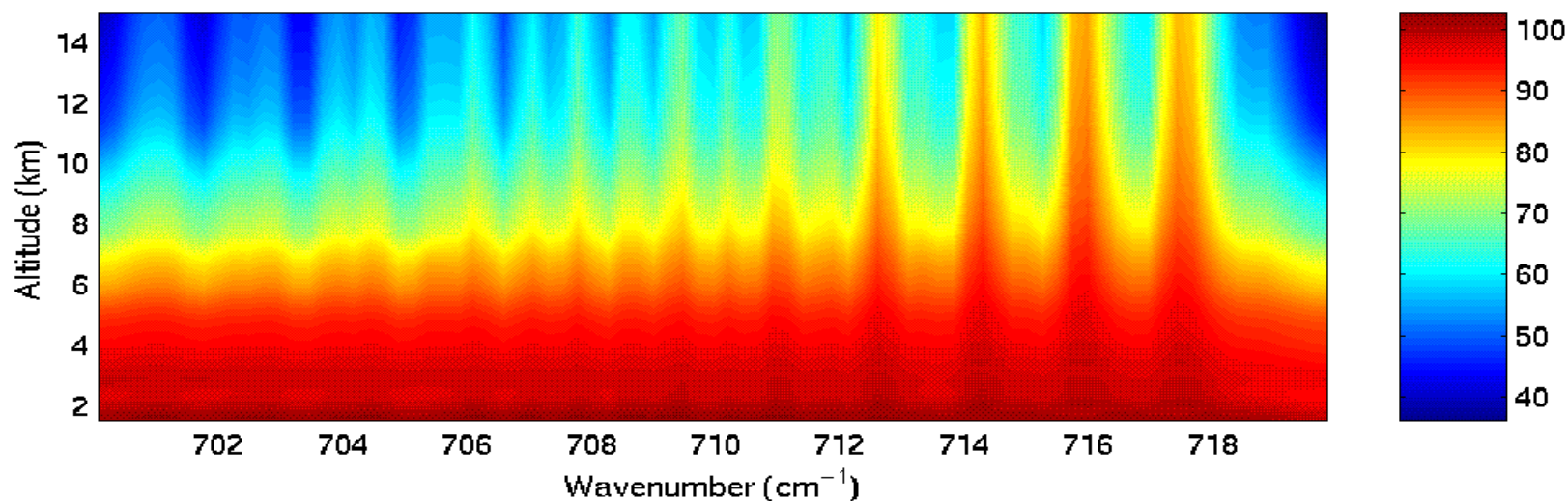


October 8, 2000 WV-IOP Proteus Profile Flight

NASTI OBSERVED RAD ($\text{mW/m}^2/\text{sr/cm}^{-1}$)



LBLRTM CALCULATED RAD ($\text{mW/m}^2/\text{sr/cm}^{-1}$)



CLAMS NAST Mission Objectives

- Validation of IR and MW radiation transfer algorithms under a variety of aerosol optical depth conditions
- Achievement of near “top of the atmosphere” IR and MW radiance spectra coincident with Terra, NOAA, and GOES satellite measurements (satellite measurement validation and algorithm development)
- Assessment of SST measurement accuracy
- Assessment of the dependence of geophysical product accuracy on aerosol optical depth
- Provide surface and atmospheric state data in support of CLAMS central objectives